No. 200000232

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

NDSU Research Foundation

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

POTATO

'Dakota Pearl'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this ninth day of April, in the year two thousand and seven.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

...tary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1 NAME OF OWNER
NDSU Research Foundation

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
ND2676-10

3. VARIETY NAME
'Dakota Pearl'

4 ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
1735 NDSU Research Park Drive
Fargo, ND 58105-5002

5. TELEPHONE *(Include area code)*
701-231-8931

6. FAX *(include area code)*
701-231-1013

FOR OFFICIAL USE ONLY

PVPO NUMBER
200000232

FILING DATE
04/21/2000

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Corporation--NDSU Research Foundation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION
North Dakota

9. DATE OF INCORPORATION
May 1989

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*

Dr. Asunta (Susie) Thompson
NDSU Plant Science Department
P.O. Box 5051

Dale Zetocha
Executive Director
NDSU Research Foundation
Box 5014
Fargo, ND 58105-5014

FEES RECEIVED

FILING AND EXAMINATION FEES:
$ 2450.00
DATE 04/21/2000

CERTIFICATION FEE:
$ 768.00
DATE 12-14-2006

11. TELEPHONE *(Include area code)*
701-231-7076

12. FAX *(Include area code)*
701-231-7851

13. E_MAIL
secor@plains.nodak.edu

14. CROP KIND *(Common Name)*
Potato

15 GENUS AND SPECIES NAME OF CROP
Solanum tuberosum

16. FAMILY NAME *(Botanical)*
Solanacease

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☒ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)

a. ☒ Exhibit A. Origin and Breeding History of the Variety
b. ☒ Exhibit B. Statement of Distinctness
c. ☒ Exhibit C. Objective Description of Variety
d. ☐ Exhibit D. Additional Description of the Variety *(Optional)*
e. ☒ Exhibit E. Statement of the Basis of the Owner's Ownership
f. ☒ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
g. ☒ Filing and Examination Fee ($2,450), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☐ YES *(If "yes", answer items 20 and 21 below)* ☒ NO *(If "no," go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☐ NO

21. IF "YES" TO ITEM 20, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☒ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☒ YES ☐ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER		SIGNATURE OF OWNER	
Dale Zetocha			
NAME *(Please print or type)*		NAME *(Please print or type)*	
Dale Zetocha			
CAPACITY OR TITLE	DATE	CAPACITY OR TITLE	DATE
Executive Director	04/20/00		

INSTRUCTIONS

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), ALL of the following items must be received in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to reproduce the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $2,450 ($300 filing fee and $2,150 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 500, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. DO NOT use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $300 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvp.htm

200000232

ITEM

18a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness

18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc.

18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant MAY NOT reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 5.5 of the Act for instructions on claiming the benefit of an earlier filing date.*

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22. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

'Dakota Pearl' was released on April 23, 1999 in the United States. 'Dakota Pearl' was first tested under a Material Transfer Agreement in the U.S. dated 6/8/98 and first tested under a Material Transfer Agreement in Canada dated 05/15/97. Material Transfer Agreements have been used since those times as well and are for testing and evaluation purposes only. No seed sales were authorized.

23. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

PBR has been applied for in Canada (Application No. 99-1734) in July 6, 1999 with protective direction.

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the variety names proposed by contacting: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center--East, Beltsville, MD 20705. Telephone: (301) 504-8089.

S&T-470 (6-98) designed by the Plant Variety Protection Office with WordPerfect 6.0a. Replaces STD-470 (03-96) which is obsolete.

EXHIBIT A

ORIGIN AND BREEDING HISTORY OF 'DAKOTA PEARL'

'Dakota Pearl' was evaluated as ND2676-10 and was released by the Agricultural Experiment Station of North Dakota and North Dakota State University (NDSU) on April 23, 1999. 'Dakota Pearl' was derived from a cross between North Dakota selections ND1118-1 and ND944-6 that was made in 1984 at NDSU (Figure 1). The clone was initially selected at the Langdon Experiment Station at Langdon, ND in 1985. Early evaluations were conducted at two locations in North Dakota. The initial cross, selection and early testing of 'Dakota Pearl' were done under the direction of Dr. Robert Johansen, NDSU (deceased). Advanced testing, seed increase, and commercial evaluation were done by several departments at NDSU, at the USDA-ARS Potato Research Worksite at East Grand Forks, MN, and by several certified seed and commercial producers in North Dakota and Minnesota. Public and private cooperators throughout the United States also provided assistance. Breeder's seed was produced at the Horticultural Research Farm, Absaraka, ND and Agronomy Seed Farm, Casselton, ND. The North Dakota State Seed Department and cooperative certified seed producers under the guidance of the NDSU potato breeding program and the NDSU Development Foundation made subsequent increases. Dakota Pearl was widely evaluated in replicated trials in nine locations from 1993 through 1998, and in regional trials at 23 North American sites (north central U.S. and Canadian provinces) from 1996 to 1998.

The cultivar 'Norchip' (Johansen et al. 1969) is in the ancestry of Dakota Pearl on both the female and male sides of the pedigree. Norchip was a chipping industry standard in the northern Great Plains for over 25 years. 'Dakota Pearl' is 1/16 *Solanum phureja,* represented on the maternal side of the pedigree in the background of ND1118-1. ND1118-1 was exceptionally resistant to cold-sweetening; however, tuber size was small and total yields low. The maternal parent of ND1118-1 was a high-protein breeding line from Minnesota. The paternal parent of MN2550 is largely derived from *S. phureja.* ND944-6 has the cultivar 'Lenape' (Akely et al. 1968) and *S. demissum, Nied.* (approximately 1.5%) in its background. The observed cold-sweetening resistance of 'Dakota Pearl' is likely derived from *S. phureja,* a species used by breeders as a source of this important trait (Lauer and Shaw 1970; Ehlenfeldt et al. 1990). Selection criteria used by the NDSU potato breeding program for the development of 'Dakota Pearl' were based on morphological, physiological, and biochemical performance and storage ability.

Since its selection in 1985, 'Dakota Pearl' has been asexually propagated via tubers as well as micro-propagated plantlets. During 14 years of evaluation, there have been no reports of variants arising from 'Dakota Pearl', indicating it is a stable genotype with uniform morphology.

Literature Cited

Akely, R.V., W.R. Mills, C.E. Cunningham and J. Watts. 1968. Lenape: a new potato variety high in solids and chipping quality. Am Potato J 45:142-145.

Ehlenfeldt, M.K., D.F. Lopez-Portilla, A.A. Boe, and R.H. Johansen. 1990. Reducing sugar accumulation in progeny families of cold chipping potato clones. Am Potato J 67:83-91.

Johansen, R.H., J.T. Schulz, and J.E. Hougelet. 1969. Norchip, a new early maturing chipping variety with high total solids. Am Potato J 46:254-258.

Lauer, F., and R. Shaw. 1970. A possible genetic source for chipping potatoes from 40 F storage. Am Potato J 47:275-278.

FIGURE 1. Pedigree of Dakota Pearl.

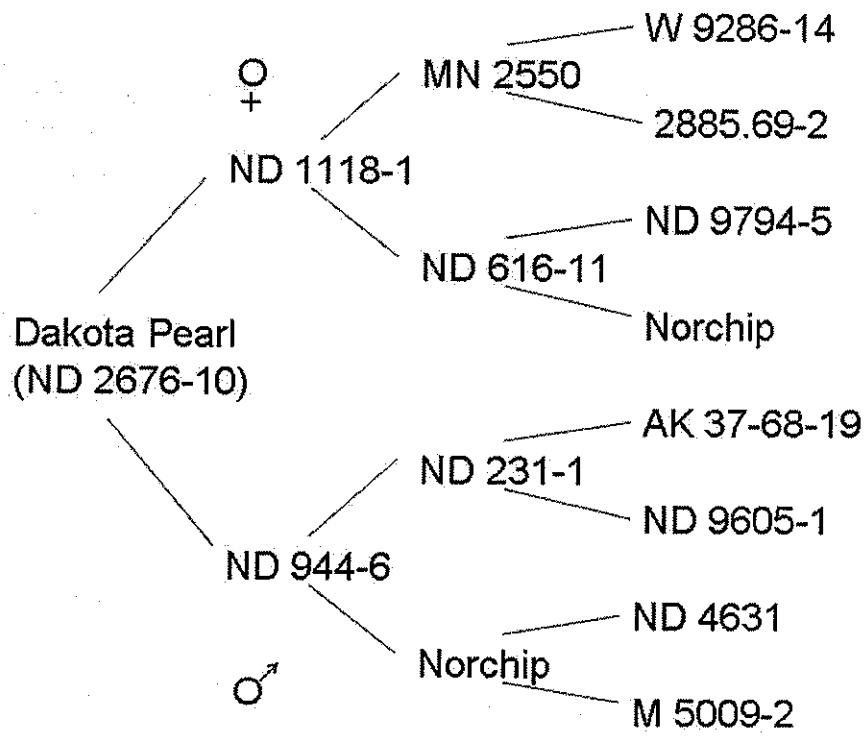


EXHIBIT B
STATEMENT OF DISTINCTNESS

The primary features of Dakota Pearl making it uniquely different from other white chipping potato cultivars, such as NorValley and Atlantic, are its low level of tuber sugars, in addition to the attractive, round, uniformly sized, smooth tubers, with bright white skin, which resemble pearls. In controlled storage trials conducted by Dr. Joseph Sowokinos, University of Minnesota, Dakota Pearl had a glucose concentration of 0.40 mg/g after 7 months storage at 5.5 C, compared to NorValley and Atlantic with 0.71 and 1.08 mg/g, respectively (Table 1). Dakota Pearl's ability to accumulate lower concentrations of reducing sugars in tubers, nearly one-half to a third lower during the 5 year controlled study, results in the consistent production of light colored, high quality processed chips, both directly from the field and from storage (Table 2).

Dakota Pearl can be distinguished from Atlantic, NorValley, and other chip cultivars based upon a combination of vine, leaf, flower, and tuber characteristics. Dakota Pearl is most similar to and closely resembles NorValley and is also compared to Atlantic, due to its commercial value and popularity. Dakota Pearl can be distinguished from Atlantic based on tubers because Atlantic has a flakey skin, while Dakota Pearl has smooth and bright white skin. Tubers of Dakota Pearl are more similar to NorValley. Both have smooth white skin, but the tuber size profile tends to be smaller, tubers are slightly more round, and tubers tend to be smoother due to the more shallow eyes. Vine characteristics of Dakota Pearl are also similar to NorValley, however traits making it unique are its slightly earlier maturity, smaller size, and also the terminal leaflet margin waviness, in addition to producing more inflorescences per plant and having fewer secondary and tertiary leaflet pairs Both have white flowers.. Vines of Atlantic differ in regard to size (slightly larger), slightly later maturity, and the light red-purple flowers. Atlantic vines also are upright in comparison to Dakota Pearl and NorValley.

Additionally, the isozyme profile is unique. An electrophoretic fingerprint based upon eight isozyme loci (Douches and Ludlam. 1991. Am Potato J 68:767-780) was determined in the Douches laboratory at Michigan State University. The isozyme profile for Dakota Pearl is as follows:

Dakota Pearl	*MDH-1* $1^2 1^2 1^2 1^{3+}$	*MDH-2* $2^2 2^2 2^2 2^2$	*6-PGD3* $3^2 3^2 3^2 3^2$
	PGI-1 $1^2 1^2 1^2 1^2$	*GOT-1* $1^3 1^3 1^3 1^4$	*GOT-2* $2^3 2^3 2^5 2^5$
	PGM-1 $1^1 1^2 1^2 1^3$	*PGM-2* $2^2 2^2 2^2 2^2$	

Seed certification agencies are able to recognize Dakota Pearl as a distinct cultivar in the field and are able to distinguish it from other cultivars based on morphological characteristics during visual inspections of fields entered for certification.

Dakota Pearl is suitable for the chip processing industry and for the fresh market. Specific gravity is high, averaging 1.090 in non-irrigated production environments and 1.083 in irrigated production locales. It will process from 5.5 C (42 F) storage. Dakota Pearl exhibits no notable disease or pest resistance, nor exceptional susceptibility. Hollow heart has been

noted occasionally, in addition to internal necrosis, in grower fields and research trials. Symptom expression of bacterial ring rot is typical for both vines and tubers, however wilting associated with infection was not noted in replicated trials. Field evaluations of metribuzin sensitivity indicate it is moderately susceptible to this common herbicide.

The unique combination of the above characteristics, used to differentiate potato cultivars, make Dakota Pearl distinct.

TABLE 1. Relative glucose concentrations following seven months storage at 5.5 C (1998-2003).

Clone	Glucose[1] mg/g FW
Dakota Pearl	0.40
ND860-2	0.38
Snowden	0.67
NorValley	0.71
Atlantic	1.08
Norchip	2.16

[1] Readings represent a five year average. Each year's value was obtained from a composite sample taken from eight tubers.

TABLE 2. Average chip color (reported as Agtron values) of Dakota Pearl, ND860-2, NorValley, Norchip, Atlantic, and Snowden, from 3.3 and 5.5 C at three and five months storage, respectively.[1]

	Chip Color[2]								
	3.3 C 5 months			5.5 C 3 months			5.5 C 5 months		
Clone	1998	1999	2000	1998	1999	2000	1998	1999	2000
Dakota Pearl	50	43	50	60	59	62	56	55	54
ND860-2	54	45	51	65	58	61	55	56	54
NorValley	40	38	46	56	55	60	56	57	51
Norchip	38	35	36	45	40	61	41	36	46
Atlantic	-[3]	-	39	47	-	56	-	-	49
Snowden	46	38	48	52	51	53	55	52	56

[1] Data represents an average from six potato tubers.
[2] Agtron values = spectral reflectance; values of 55 or higher denote acceptably colored potato chips.
[3] Dash indicates data not available.

Table 6A. Sensory evaluation of *Dakota Pearl* and check varieties from dryland sites during 1992-1998[1].

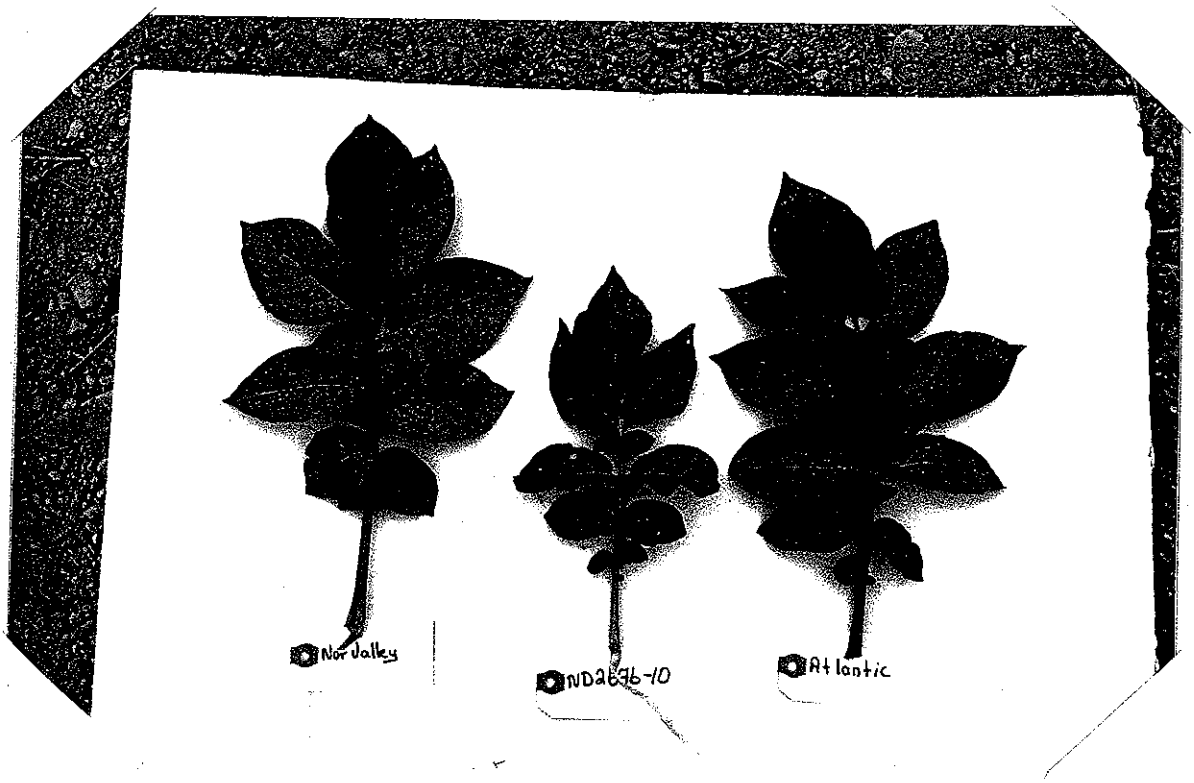
	Boiling					Baking			Microwaving			
Cultivar	Sloughing	Color	Color (4 hrs)	Mealiness	Flavor	Mealiness	Color	Flavor	Mealiness	Color	Flavor	Summation of all values
Dakota Pearl	5.6	7.9	6.8	6.5	6.4	6.6	8.0	6.7	6.3	7.4	6.7	76.2
NorValley	7.4	7.2	6.2	6.1	6.2	6.9	8.2	6.6	6.8	7.7	6.5	75.8
Norchip	7.5	8.0	7.3	5.7	6.6	6.7	8.1	6.8	6.3	7.8	6.6	77.4
Snowden	5.5	7.1	6.4	6.7	5.4	7.4	7.7	5.7	6.9	7.1	5.8	71.1
Atlantic	4.8	7.3	7.1	7.3	6.4	7.1	8.3	6.5	7.4	7.4	6.6	74.9

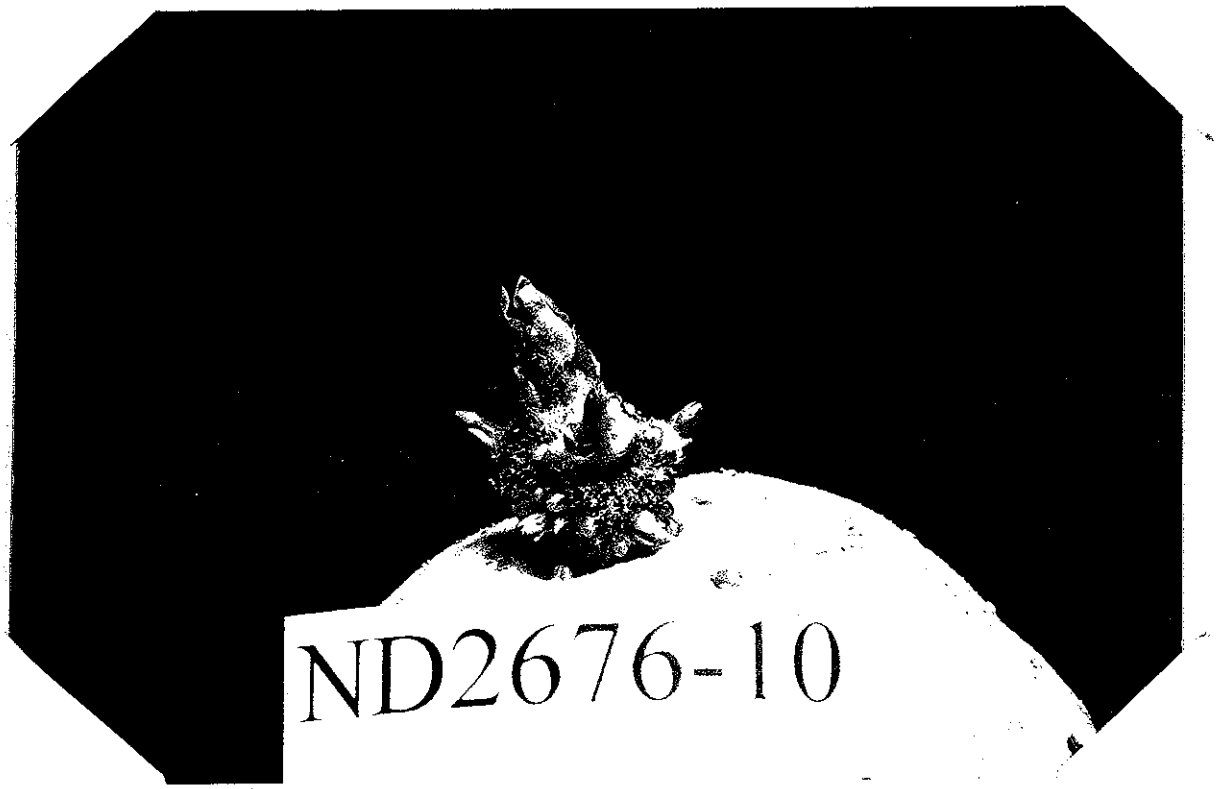
[1]Evaluation was conducted by Dr. Edna Holm, Dept. of Food and Nutrition, NDSU.. Replicated samples of each entry were evaluated by a 3-5 member panel in a "blind" taste test. Higher values are desirable for the traits evaluated

Table 6B. Sensory evaluation of *Dakota Pearl* and check varieties from irrigated sites during 1996-1998[1].

	Boiling					Baking			Microwaving			
Cultivar	Sloughing	Color	Color (4 hrs)	Mealiness	Flavor	Mealiness	Color	Flavor	Mealiness	Color	Flavor	Summation of all values
Dakota Pearl	5.3	7.9	6.5	5.5	5.5	5.8	8.0	5.6	5.1	7.7	5.8	68.7
NorValley	7.2	8.6	5.9.	4.6	5.9	6.0	8.4	5.7	5.3	7.8	5.9	71.3
Norchip	7.3	8.6	6.8	5.0	5.8	5.7	8.1	5.9	5.4	8.1	6.2	72.9
Snowden	4.1	8.3	7.7	7.0	5.8	6.9	7.8	5.4	6.2	7.7	6.0	72.9
Atlantic	5.7	8.5	7.2	6.6	6.2	6.6	8.3	6.3	6.6	7.9	5.9	75.8

[1]Evaluation was conducted by Dr. Edna Holm, Dept. of Food and Nutrition, NDSU. Replicated samples of each entry were evaluated by a 3-5 member panel in a "blind" taste test. Higher values are desirable for the traits evaluated.


Nor Valley
ND2636-10
Atlantic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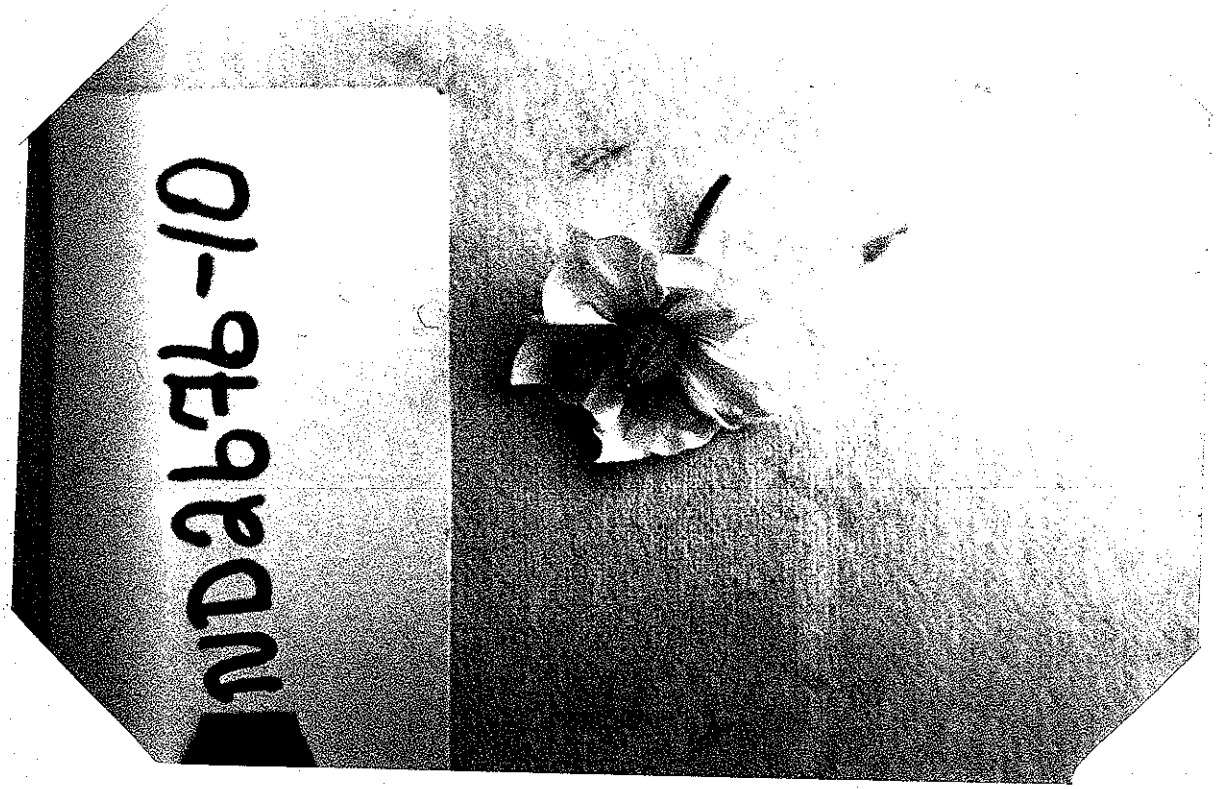
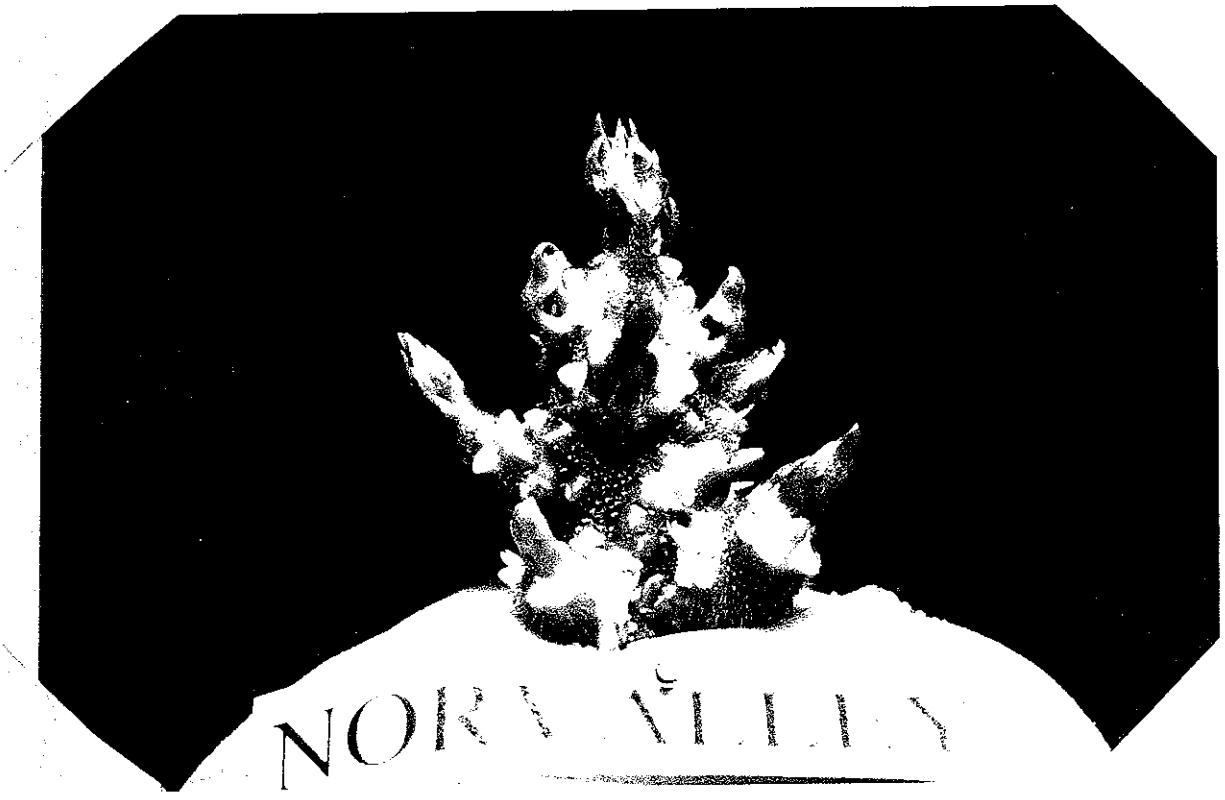

ND2676-10


ATLANTIC


NOR

200000232

Objective Description of Variety

DAKOTA PEARL

North Tilley, N.B.
1999

Global Agri Services Inc.

NORTH DAKOTA PBR & PVP SELECTION TRIAL 1999
NORTH TILLEY, NEW BRUNSWICK

OBJECTIVE

The objective of this experiment is to prepare the potato objective description for the examination of the Plant Breeder's Rights and Plant Variety Protection..

MATERIALS & METHODS

Varieties:

There was 6 varieties in the trial. The varieties Red Pontiac, Norland, Atlantic and Norvalley were used as standard varieties.

Design:

A randomized complete block with 6 varieties and four replicates. All entries were planted in single-row plots and each entry had one plot per replicate. A plot was 18' long (5.5 m). Spacing between adjacent plots was 36"(91cm). Spacing between adjacent hills within plot was 12" (30.5 cm).

Planting:

The trial was planted on May 28, 1999

Fertility:

1500 lbs/A 10-10-20 (McCain formulation Z)

Spacing:

All varieties were planted at 12" (30.5cm).

Harvest:

The field was topkill September 10, 1999 and harvested September 26, 1999. Yield data was collected on replication number four.

RAINFALL

Month of May 1.9" (48mm) -representing the last week of the month only-
Month of June 2.4" (60mm)
Month of July 2.4" (60mm)
Month of August 3.7" (90.7mm)
Month of September 8.4" (213 mm)

GENERAL OBSERVATIONS

The environmental conditions at planting of the trial were very dry at the start but in the latter part of the planting we received substantial amount of rain, causing some severe seed peace decay in some varieties. The growing season is summarize as very dry and hot. The rain arrived at harvesting time causing some delay.

SECTIONS COMPLETED BY GLOBAL AGRI SERVICES INC.

1. Market Characteristics
2. Plant Characteristics
3. Stem Characteristics
4. Leaf Characteristics
5. Inflorescence Characteristics
6. Tuber Characteristics
7. Sprout Characteristics

200000232

Exhibit C (*Potato*)

OBJECTIVE DESCRIPTION OF VARIETY

POTATO (*Solanum tuberosum L.*)

NAME OF APPLICANT(S)
NDSU Research Foundation

FOR OFFICIAL USE ONLY
PVPO NUMBER

ADDRESS
1735 NDSU Research Park Drive
Fargo, ND 58105-5002

VARIETY NAME
Dakota Pearl

TEMPORARY OR EXPERIMENTAL DESIGNATION

REFERENCE VARIETY 1 (R1)
NorValley

REFERENCE VARIETY 2 (R2)
Atlantic

1. MARKET CHARACTERISTICS:

MARKET CLASS:
1 = Yellow-flesh tablestock; 2 = Round-white tablestock; 3 = Chip-processing; 4 = Frozen-processing
5 = Russet tablestock; 6 = Other_____

VARIETY	R1	R2
3	3	3

2. PLANT CHARACTERISTICS:

GROWTH HABIT:
1 = Erect (>45° with ground); 5 = Semi-erect (30-45° with ground); 7 = Spreading.

VARIETY	R1	R2
5	5	5

TYPE:
1 = Stem (foliage open, stems clearly visible: 2 = Intermediate; 3 = Leaf (foliage closed, stems hardly visible)

VARIETY	R1	R2
2	3	3

MATURITY: Days after planting (DAP) at vine senescence.

VARIETY	R1	R2

PLANTING DATE:

VARIETY	R1	R2
May 28, 1999	May 28, 1999	May 28, 1999

REGION/AREA:

VARIETY	R1	R2
North Tilley, N.B.	North Tilley, N.B.	North Tilley, N.B.

MATURITY CLASS:
1 = Very Early (<100 DAP); 2 = Early (100-110 DAP); 3 = Mid-season (111-120 DAP); 4 = Late (121-130 DAP); 5 = Very Late (> 130 DAP).

VARIETY	R1	R2
3	3	3

3. STEM CHARACTERISTICS: Measure at early first bloom
* STEM ANTHOCYANIN COLORATION:
1 = Absent; 3 = Weak; 5 = Medium; 7 = Strong; 9 = Very Strong

VARIETY	R1	R2
3	1	2-3

STEM WINGS
1 = Absent; 3 = Weak; 5 = Medium; 7 = Strong; 9 = Very Strong

VARIETY	R1	R2
5	5	7

4. LEAF CHARACTERISTICS:
LEAF COLOR: Observe fully developed leaves located on middle ⅓ of plant
1 = Yellowish-green; 2 = Olive-green; 3 = Medium green; 4 = Dark green; 5 = Grey-green; 6 = other

VARIETY	R1	R2
1-2	2-3	2-3

LEAF COLOR: Observe fully developed leaves located on middle ⅓ of plant
Royal Horticulture Society Color Chart

VARIETY	R1	R2
147B	147A	137A

LEAF PUBESCENCE DENSITY:
1 = Absent; 2 = Sparse; 3 = Medium; 4 = Thick; 5 = Heavy

VARIETY	R1	R2
2	3	3

LEAF PUBESCENCE LENGTH:
1 = None; 2 = Short; 3 = Medium; 4 = Long; 5 = Very long

VARIETY	R1	R2
2	2	2

* LEAF SILHOUETTE
1 = Closed; 3 = Medium; 5 = Open

VARIETY	R1	R2
3	3	3

PETIOLES ANTHOCYANIN COLORATION:
1 = Absent: 3 = Weak; 5 = Medium; 7 = Strong; 9 = Very Strong

VARIETY	R1	R2
1	1	1

LEAF STIPULES SIZE
1 = Absent; 3 = Small; 5 = Medium: 7 = Large

VARIETY	R1	R2
7	5	7

TERMINAL LEAFLET SHAPE:
1 = Narrowly ovate; 2 = Medium ovate; 3 = Broadly ovate; 4 = Lanceolate; 5 = Elliptical;
6 = Obovate; 7 = Oblong; 8 = other

VARIETY	R1	R2
1-2	2-3	2

TERMINAL LEAFLET TIP SHAPE:
1 = Acute; 2 = Cuspidate; 3 = Acuminate; 4 = Obtuse; 5 = other

VARIETY	R1	R2
1	1-3	1-3

* TERMINAL LEAFLET BASE SHAPE:
1 = Cuneate; 2 = Acute; 3 = Obtuse; 4 = Cordate; 5 = Truncate; 6 = Lobed; 7 = Other

VARIETY	R1	R2
3-4	4	3-4

* TERMINAL LEAFLET MARGIN WAVINESS:
1 = Absent; 2 = Slight; 3 = Weak; 4 = Medium; 5 = Strong

VARIETY	R1	R2
4	2-3	2-3

NUMBER OF PRIMARY LEAFLET PAIRS:
AVERAGE:

VARIETY	R1	R2
4.9	5.1	5

RANGE:

VARIETY	R1	R2
4-5	5-6	5

PRIMARY LEAFLET TIP SHAPE:
1 = Acute; 2 = Cuspidate; 3 = Acuminate; 4 = Obtuse; 5 = Other

VARIETY	R1	R2
1	1	1

* PRIMARY LEAFLET SIZE:
1 = Very Small; 2 = Small; 3 = Medium; 4 = Large; 5 = Very Large

VARIETY	R1	R2
3	3	4

PRIMARY LEAFLET SHAPE:
1 = Narrowly ovate: 2 = Medium ovate; 3 = Broadly ovate; 4 = Lanceolate; 5 = Elliptical; 6 = Obovate; 7 = Oblong; 8 = Other

VARIETY	R1	R2
1	1-2	1

PRIMARY LEAFLET BASE SHAPE:
1 = Cuneate; 2 = Acute; 3 = Obtuse; 4 = Cordate; 5 = Truncate: 6 = Lobed; 7 = Other

VARIETY	R1	R2
4	4	4

NUMBER OF SECONDARY AND TERTIARY LEAFLET PAIRS:
AVERAGE:

VARIETY	R1	R2
4.0	6.9	14.6

RANGE:

VARIETY	R1	R2
2-5	6-9	5-19

5. INFLORESCENCE CHARACTERISTICS:
NUMBER OF INFLORESCENCE / PLANT
AVERAGE

VARIETY	R1	R2
4.0	2.4	4

RANGE:

VARIETY	R1	R2
3-5	1-4	3-5

NUMBER OF FLORETS / INFLORESCENCE:
AVERAGE:

VARIETY	R1	R2
12.0	13.0	10.0

RANGE:

VARIETY	R1	R2
9-15	6-18	10-10

* COROLLA INNER SURFACE CHART VALUE: Measure predominant color of newly open flower RHSCC.

VARIETY	R1	R2
157A	155A	76B

* COROLLA OUTER SURFACE COLOR: RHSCC

VARIETY	R1	R2
157A	155A	76C

COROLLA SHAPE:
1 = Very rotate; 2 = Rotate; 3 = Pentagonal; 4 = Semi-stellate; 5 = Stellate

VARIETY	R1	R2
3	3	3

CALYX ANTHOCYANIN COLORATION:
1 = Absent; 3 = Weak; 5 = Medium; 7 = Strong; 9 = Very strong

VARIETY	R1	R2
1	1	1-3

ANTHER COLOR: Measure when newly opened flower is fully expanded RHSCC

VARIETY	R1	R2
15A	15A	12A

ANTHER SHAPE:
1 = Broad cone; 2 = Narrow cone; 3 = Pear shape cone; 4 = Loose; 5 = Other

VARIETY	R1	R2
1	1-2	2

POLLEN PRODUCTION:
1 = None; 3 = Some; 5 = Abundant

VARIETY	R1	R2
5	5	3

STIGMA SHAPE:
1 = Capitate; 2 = Clavate; 3 = Bi-lobed

VARIETY	R1	R2
1	1	1

STIGMA COLOR: RHSCC

VARIETY	R1	R2
147A	146A	146A

BERRY PRODUCTION: UNDER FIELD CONDITIONS:
1 = None; 3 = low; 5 = Moderate; 7 = Heavy; 9 = Very heavy

VARIETY	R1	R2
5	4	3

6. TUBER CHARACTERISTICS:

* PREDOMINANT SKIN COLOR:

1 = White; 2 = Light Yellow; 3 = Yellow; 4 = Buff; 5 = Tan; 6 = Brown; 7 = Pink; 8 = red; 9 = Purplish-red; 10 = Purple: 11 = Dark purple-black; 12 = Other_____

VARIETY	R1	R2
2	2	4

RHSCC:

VARIETY	R1	R2
161B	161A	164C

SECONDARY SKIN COLOR:

1 = Absent; 2 = Present, please describe_____

VARIETY	R1	R2
1	1	1

RHSCC:

VARIETY	R1	R2
-	-	-

SECONDARY SKIN COLOR DISTRIBUTION:

1= Eyes; 2 = Eyebrows; 3= Splashed; 4 = Scattered; 5 = Spectacled; 6 = Stippled; 7 = Other_____

VARIETY	R1	R2
-	-	-

SKIN TEXTURE:

1 = Smooth; 2 = Rough (flaky); 3 = Netted; 4 = Russetted; 5 = Heavily russetted; 6 = Other_____

VARIETY	R1	R2
1	1-3	2-3

* TUBER SHAPE:

1 = Compressed; 2 = Round; 3 = Oval; 4 = Oblong; 5 = Long; 6 = Other_____

VARIETY	R1	R2
2	2	2

TUBER THICKNESS:
1 = Round: 2 = Medium thick: 3 = Slightly flatted; 4 = Flatted; 5 = Other

VARIETY	R1	R2
1	1	1

TUBER LENGTH (mm):
AVERAGE:

VARIETY	R1	R2
65.0	69.6	53.9

RANGE:

VARIETY	R1	R2
54-74	58-78	45-62

STANDARD DEVIATION:

VARIETY	R1	R2
5.5	5.9	5.1

AVERAGE WEIGHT OF SAMPLE TAKEN:

VARIETY	R1	R2
149.2	180.8	106.3

TUBER WIDTH (mm):
AVERAGE:

VARIETY	R1	R2
66.2	70.7	59.6

RANGE:

VARIETY	R1	R2
60-81	60-80	52-65

STANDARD DEVIATION:

VARIETY	R1	R2
5.9	5.1	3.1

AVERAGE WEIGHT OF SAMPLE TAKEN:

VARIETY	R1	R2
149.2	180.8	106.3

TUBER THICKNESS (mm):
AVERAGE:

VARIETY	R1	R2
56.3	56.6	51.4

RANGE:

VARIETY	R1	R2
45-68	48-64	46-57

STANDARD DEVIATION:

VARIETY	R1	R2
5.7	4.4	3.1

AVERAGE WEIGHT OF SAMPLE TAKEN:

VARIETY	R1	R2
149.2	180.8	106.3

TUBER EYE DEPTH:
1 = Protruding; 2 = Shallow; 3 = Intermediate; 4 = Deep; 5 = Very Deep

VARIETY	R1	R2
3	3-4	3

TUBER LATERAL EYES:
1 = Protruding; 2 = Shallow; 3 = Intermediate; 4 = Deep; 5 Very deep

VARIETY	R1	R2
2	3	2

NUMBER EYE / TUBER:
AVERAGE:

VARIETY	R1	R2
8.8	7.4	5.6

RANGE:

VARIETY	R1	R2
8-9	6-8	5-7

DISTRIBUTION OF TUBER EYES:
1 = Predominantly apical; 2 = Evenly distributed

VARIETY	R1	R2
1	1	1

PROMINENCE OF TUBER EYEBROWS:
1 = Not prominent; 2 = Slight prominence; 3 = Medium prominence; 4 = very prominenece; 5 Other

VARIETY	R1	R2
2	2	1

* PRIMARY TUBER FLESH COLOR: RHSCC

VARIETY	R1	R2
18D	158B	160C

SECONDARY TUBER FLESH COLOR:
1 = Absent; 2 = Present, please describe

VARIETY	R1	R2
1	1	1

RHSCC:

VARIETY	R1	R2
-	-	-

NUMBER OF TUBER / PLANT:
1 = Low (<8); 2 = Medium (8-15); 3 = High(>15)

VARIETY	R1	R2
1	1	1

7. DISEASES CHARACTERISTICS:

DISEASES REACTION:
0 = Not tested; 1 = Resistant; 3 = Moderately resistant; 5 = Moderately susceptible; 7 = Susceptible; 9 = Highly susceptible

BACTERIAL RING ROT: Foliar reaction

VARIETY	R1	R2
6	7	7

BACTERIAL RING ROT: Tuber reaction

VARIETY	R1	R2
7	7	7

LATE BLIGHT

VARIETY	R1	R2
7	7	1

PLRV

VARIETY	R1	R2
6	7	5

PVX

VARIETY	R1	R2
7	7	1

PVY

VARIETY	R1	R2
7	7	7

OTHER_____

VARIETY	R1	R2

OTHER_____

VARIETY	R1	R2

8. PESTS CHARACTERISTICS:

PEST REACTION:

0 = Not tested; 1 = Resistant; 3 = Moderately resistant; 5 = Moderately susceptible; 7 = Susceptible; 9 = Highly susceptible

GOLDEN NEMATODE

VARIETY	R1	R2
0	0	1 (race A)

OTHER

VARIETY	R1	R2

9. GENE TRAITS:

INSERTION OF GENES:

YES ☐ NO ☒

IF YES, DESCRIBE

10. QUALITY CHARACTERISTICS:

CHIEF MARKET:

SPECIFIC GRAVITY:

1< 1.060: 2 = 1.060-1.069; 3 = 1.070-1.079; 4 = 1.080-1.089; 5 > 1.090

VARIETY	R1	R2
4	4	4

TOTAL GLYCOALKALOID CONTENT (mg./100g. fresh tuber):

VARIETY	R1	R2
1.5	4.3	7.8

OTHER QUALITY CHARACTERISTICS:

11. CHEMICAL IDENTIFICATION: **Chemical identification of 'Dakota Pearl' was conducted using protein electrophoresis. 'NorValley' was included as the standard check cultivar. Evaluation was conducted by the North Dakota State Seed Department using the attached protocols. Band differences between the two cultivars are shown in Figures 1 and 2. This protein electrophoretic data allows for the identification of 'Dakota Pearl' and shows it is uniquely different.**

12. ADDITIONAL COMMENTS AND CHARACTERISTICS:

See additional information.

7.0 LIGHT SPROUT CHARACTERISTICS (+)

7.1 Light sprout: general shape

(*) (+)

		CV	R1	R2	R3	R4
spherical	1	1	4	2		
ovoid	2					
conical	3					
broad cylindrical	4					
narrow cylindrical	5					
other (describe)	6					

7.2 Light sprout base: pubescence

(*)

absent	1	7	3	5		
weak	3					
medium	5					
strong	7					
very strong	9					

7.3 Light sprout base: anthocyanin colouration

(*)

green	1	2	2	3		
red-violet	2					
blue-violet	3					
other (describe)	4					

7.4 Light sprout base: intensity of anthocyanin colouration (if present)

(*)

absent	1	5	5	5-7		
weak	3					
medium	5					
strong	7					
very strong	9					

7.5 Light sprout tip: habit

(+)

closed	3	3	3	3		
medium	5					
open	7					

7.6 Light sprout tip: pubescence

		CV	R1	R2	R3	R4
absent	1	5	3	7		
weak	3					
medium	5					
strong	7					
very strong	9					

7.7 Light sprout tip: anthocyanin colouration (*)

green	1	2	1	1-2		
red-violet	2					
blue-violet	3					
other (describe)	4					

7.8 Light sprout tip: intensity of anthocyanin colouration (if present)

absent	1	3	1	1-3		
weak	3					
medium	5					
strong	7					
very strong	9					

7.9 Light sprout root initials: frequency

low	3	5	3	3		
medium	5					
high	7					

7.10 Light sprout: protrusion of lenticels

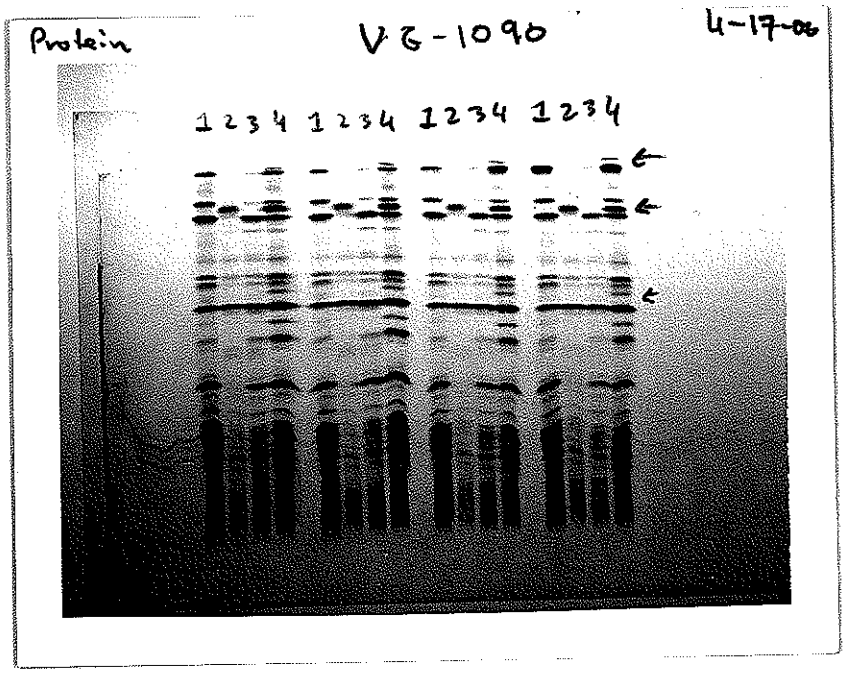
weak	3	3	3	3		
medium	5					
strong	7					

7.11 Light sprout: length of lateral shoots

short	3	3	5	3		
medium	5					
long	7					

EXHIBIT D

200000232



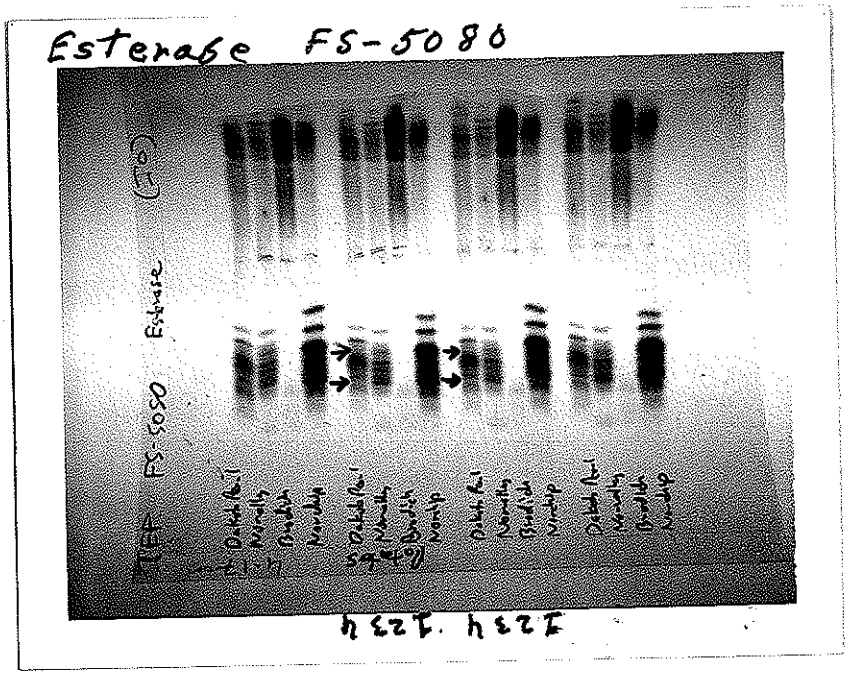
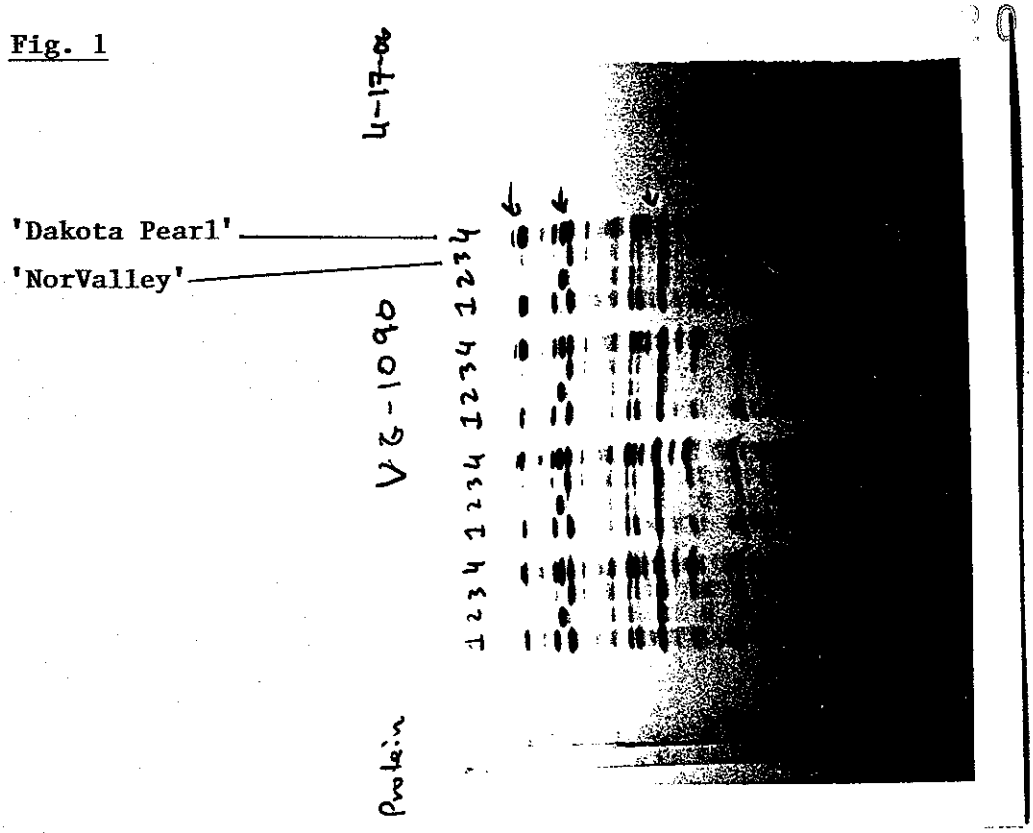


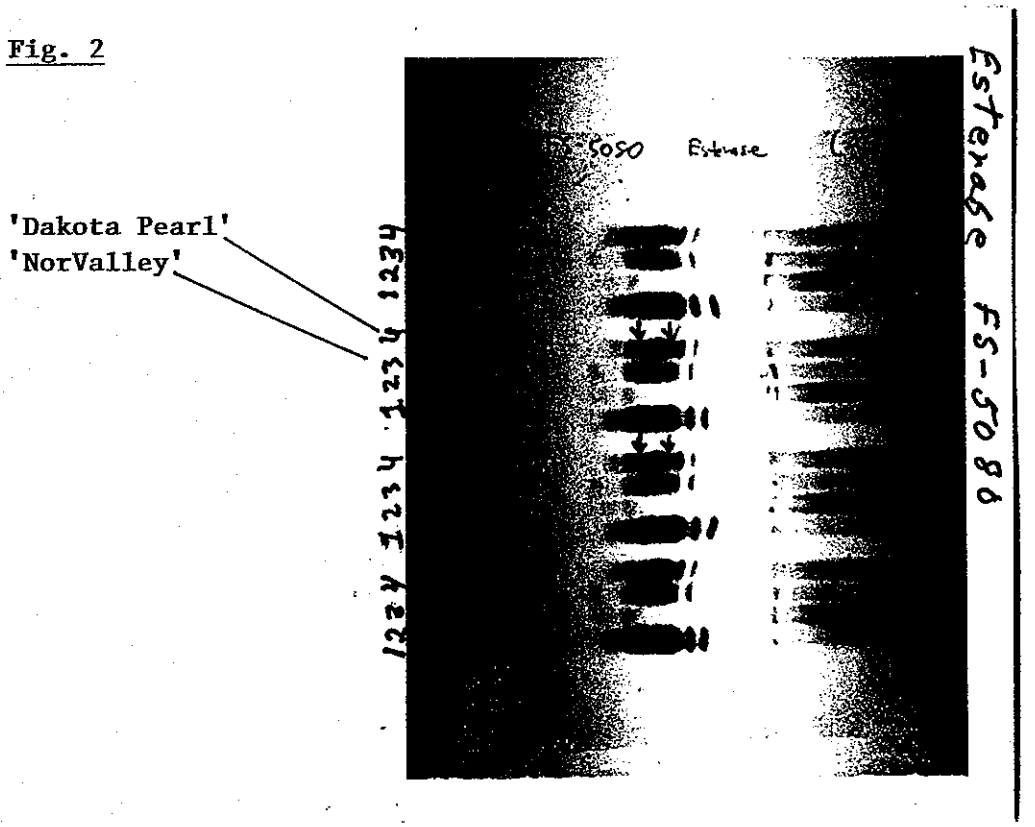
Fig. 1



IEF VG-10 90
G-250 Protein Stain
ran as follows
15' 30 W
30' 40 W
10 μL sample

Fig. 1 Total Protein Profiles for 'Dakota Pearl' and 'NorValley' following electrofocusing. Arrows indicate regions where protein bands are present in 'Dakota Pearl' but missing in 'NorValley'. Each cultivar is represented by four sample lanes.

Fig. 2



IEF FS-5080
Esterase Stain
ran as follows:
60' 35 W
20' 60 W
10 μL sample

Fig. 2 Comparison of Esterase band profiles of 'Dakota Pearl' and 'NorValley'. Each cultivar is represented by four sample lanes. Arrows indicate bands present in 'NorValley' but missing in 'Dakota Pearl'.

ible 2. U.S. No.1 yield, percentage of U.S. No. 1, and total solids for *Dakota Pearl* in dryland trials at Grand Forks (GF), Park River (PR), ND, and Crookston (CR), MN (1993, 1994, 1997 and 1998). *(1995, 1996, and 1997 trials at Grand Forks were not reported due to flooding of plots with associated poor yields).*

	1993		1994	1997	1998	
Variety	**GF**	**PR**	**PR**	**PR**	**CR**	**AVG[1]**
U.S. No. 1 (cwt/acre)						
Dakota Pearl	147	117	134	152[2] bcdefgji	286 ab	**167**
NorValley	141	201	180	278 a	229 bcdef	**206**
Norchip	156	77	117	–	316 a	**167**
Atlantic	–	–	126	190 bcd	219 bcdef	**178 (191)**
Snowden	142	214	140	169 bcdefg	174 defg	**168 (171)**
% U.S. No. 1						
Dakota Pearl	93	76	62	66	93	**78**
NorValley	77	66	58	82	89	**74**
Norchip	84	57	73	–	90	**76 (81)**
Atlantic	–	–	62	74	92	**76 (73)**
Snowden	84	85	66	81	89	**81**
Specific Gravity (1.091 abbreviated as 91)						
Dakota Pearl	91	76	90	90	103	**90**
NorValley	87	76	93	81	88	**85**
Norchip	91	78	92	–	98	**90 (90)**
Atlantic	–	--	99	91	100	**97 (94)**
Snowden	99	86	94	98	102	**96**

[1]Numbers in parentheses were the average values for Dakota Pearl across the same trials that 'Norchip' and 'Atlantic' were entries in.
[2]Yield means with the same letter are not significantly different from one another based on Duncan's Multiple Range Test with an alpha value of 0.05

Table 3. U.S. No.1 yield, percentage of U.S. No. 1, and specific gravity for ***Dakota Pearl*** in irrigated trials at Carrington (C), Oakes (O), Dawson (D) McCanna (McC), and McLeod (McL), ND (1994-1998).

	1994	1995	1996		1997		1998		
Variety	C, D & O[1]	O	McC	O	McC	O	McC	McL	Avg
cwt/acre U.S. No. 1									
Dakota Pearl	318	364	296 cdef	341	488 abcde	247 bcdefgh	371 abc	257 bcdefg	335
NorValley	341	467	359 ab	428	386 cdefghij	241 bcdefgh	358 bcd	272 bcdef	357
Norchip	377	396	290 defg	319	350 fghijk	--	299 bcdefgh	266 bcdef	328
Snowden	370	342	294 cdef	345	370 defghijk	266 bcdefgh	305 bcdefgh	267 bcdef	320
Atlantic	371	427	279 defg	398	447 bcdefgh	328 abc	2[illegible] bcdefghi	333 abc	359
% U.S. No. 1									
Dakota Pearl	94	93	91	91	92	84	94	83	90
NorValley	89	93	88	90	88	82	87	85	88
Norchip	89	85	79	91	79	--	87	82	85
Snowden	93	97	90	94	92	91	92	88	81
Atlantic	95	93	87	96	90	86	84	90	90
Specific Gravity									
Dakota Pearl	82	84	84	91	83	78	74	80	82
NorValley	80	84	86	84	79	73	76	76	80
Norchip	79	85	88	86	86	--	77	81	83
Snowden	93	89	100	91	98	87	87	87	92
Atlantic	92	92	91	87	93	85	86	87	89

[1] Average yield across all three irrigated sites in 1994

Table 4. Summary of *Dakota Pearl's* performance relative to other cultivars in the North Central Regional Potato Variety Trial (1996-98).

	1996				1997				1998				
Variety	U.S. #1 (cwt/acre)	% U.S.#1	Specfic Gravity	Rank[1]	U.S. #1 (cwt/acre)	% U.S. #1	Specific Gravity	Rank[1]	U.S. #1 (cwt/acre)	% U.S. #1	Specific Gravity	Rank[1]	Avg U.S. #
Dakota Pearl	248	85	1.080	--	251	84	1.074	5th	304	83	1.080	1st	268
Norchip	234	81	1.078	--	234	85	1.075	--	272	83	1.081		247
Atlantic	317	91	1.088	--	259	88	1.082	--	279	86	1.091	3rd	285
Snowden	282	74	1.083	--	280	88	1.080	--	300	88	1.089		287

[1] Each collaborator selects the top five entries in their trial based on overall merit. Values are then assigned, i.e. 1st = 5 points, 2nd = 4 points. An overall NCRPVT ranking for that year is then developed based on the summation of the individual trials' merit rankings.

[2] In the NCRPVT, selections may be entered for a maximum of three years.

Table 5. Summary of Snack Food Association Chip Variety Trials (1994, 1997 and 1998)[1].

	1994			1997			1998			Average Across Years		
Variety	U.S. #1 (cwt/acre)	Specific Gravity	Agtron Value	U.S. #1 (cwt/acre)	Specific Gravity	Agtron Value	U.S. #1 (cwt/acre)	Specific Gravity	Agtron Value	U.S. #1 (cwt/acre)[2]	Specific Gravity	Agtron Value
Dakota Pearl	308	80	64	197	79	61	234	75	64	246	78	63
NorValley	309	78	61 (63)[2]	-	-	-	-	-	-	309 (308)	78 (80)	61 (63)
Norchip	291	81	60	-	-	-	-	-	-	291 (308)	78 (80)	60 (64)
Atlantic	308	92	59	277	89	58	298	86	59 (63)	294	89	59 (63)
Snowden	-	-	-	287	87	57	270	83	63	279 (216)	85 (77)	60 (63)

[1] Non-replicated field trial; Agtron values based on chips produced within 48 hours of harvest.

[2] Numbers in parentheses were the average values for Dakota Pearl across the same trials that 'NorValley', 'Norchip' and 'Atlantic' were entries in.

Table 2. U.S. No. 1 yield, percentage of U.S. No.1 and total solids for *Dakota Pearl* in Dryland trials at Grand Forks (GF), Park River (PR), Hoople, ND and Crookston (CR), MN (1993, 1994, 1997, 1998 and 1999). *(1995, 1996 and 1997 trials at Grand Forks were not reported due to flooding of plots with associated poor yields. The 1999 trial at Crookston was not reported due to it's loss as a result of late blight.*

	1993		1994	1997	1998	1999	
Variety	GF	PR	PR	PR	CR	H	Avg
U.S. No.1 (cwt/A)							
Dakota Pearl	147	117	134	152	286	218	176
NorValley	141	201	180	278	229	300	222
Norchip	156	77	117	--	316	222 (180)	167
Atlantic	--	--	126	190	219	268 (198)	178
Snowden	142	214	140	169	174	218	176
%U.S. No.1							
Dakota Pearl	93	76	62	66	93	93	81
NorValley	77	66	58	82	89	90	77
Norchip	84	57	73	--	90	89 (79)	76
Atlantic	--	--	62	74	92	94 (83)	76
Snowden	84	85	66	81	89	90	83
Specific Gravity	(1.091 abbreviated as 91)						
Dakota Pearl	91	76	90	90	103	93	91
NorValley	87	76	93	81	88	90	86
Norchip	91	78	92	--	98	90 (91)	90
Atlantic	--	--	99	91	100	113 (94)	97
Snowden	99	86	94	98	102	101	97

[1] Numbers in parentheses were the average values for Dakota Pearl across the same trials that 'Norchip' and 'Atlantic' were entries in.

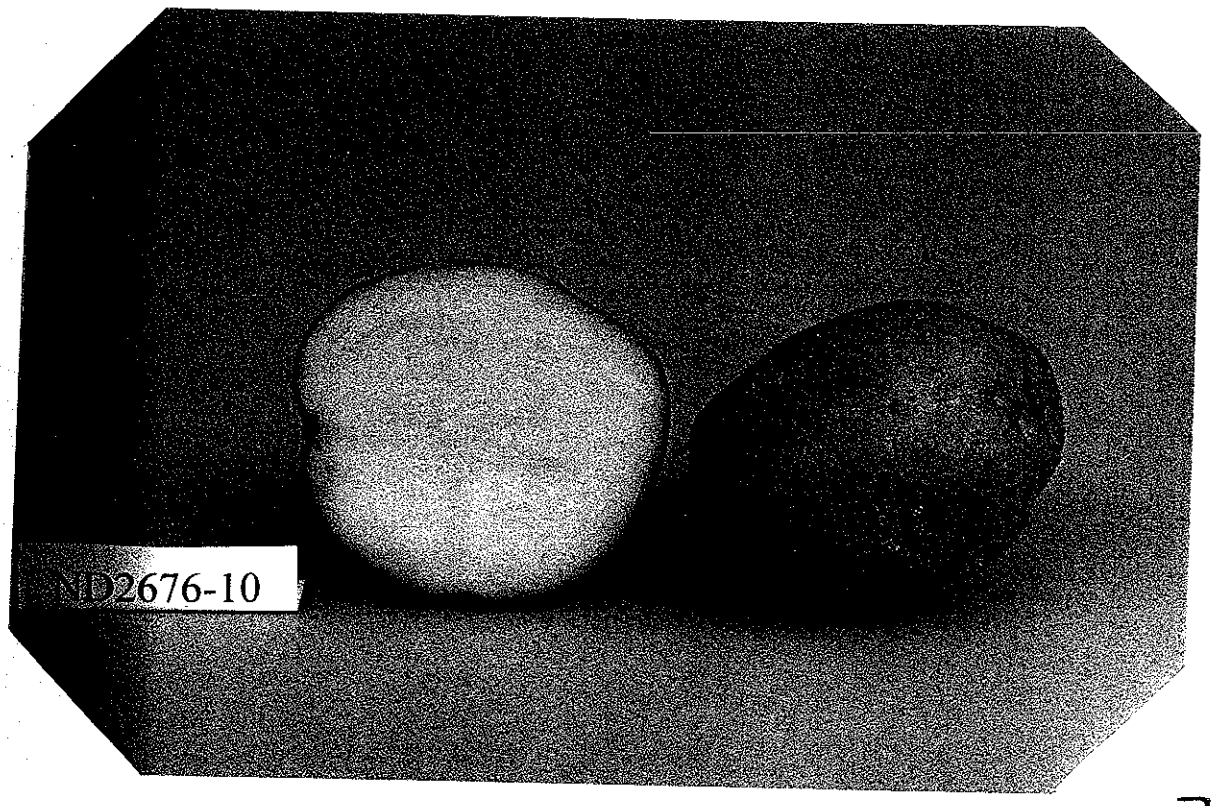
Table 3. U.S. No. 1 yield, percentage of U.S. No. 1, and specific gravity for *Dakota Pearl* in irrigated trials at Carrington (C), Oakes (O), Dawson (D), McCanna, McCloud (McL) and Glyndon (G) (1994-1999).

	1994	1995	1996		1997		1998		1999		
Variety	C, D, & O[1]	O	McC	O	McC	O	McC	McL	McC	G	Avg
U.S. No.1											
Dakota Pearl	318	364	296	341	488	247	371	257	279	200	316
NorValley	341	467	359	428	386	241	358	272	232	120	320
Norchip	377	396	290	319	350	--	298	266	265	127	299
Snowden	370	342	294	345	370	266	305	267	404	221	318
Atlantic	371	427	279	398	447	328	285	333	325	229	342
% U.S. No.1											
Dakota Pearl	94	93	91	91	92	84	94	83	91	83	90
NorValley	89	93	88	90	88	82	87	85	83	69	85
Norchip	89	85	79	91	79	--	87	82	82	70	83
Snowden	93	97	90	94	92	91	92	88	96	91	92
Atlantic	95	93	87	96	90	86	84	90	91	85	90
Specific Gravity											
Dakota Pearl	82	84	84	91	83	78	74	80	76	91	82
NorValley	80	84	86	84	79	73	76	76	80	80	80
Norchip	79	85	88	86	86	--	77	81	77	87	83
Snowden	93	89	100	91	98	87	87	87	93	86	91
Atlantic	92	92	91	87	93	85	86	87	94	94	90

[1] Average yield across all three irrigated sites in 1994

01-9484-10


ND2676-10


ND2676-10

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
NDSU Research Foundation	ND2676-10	'Dakota Pearl'

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	5. TELEPHONE *(include area code)*	6. FAX *(include area code)*
1735 NDSU Research Park Drive Fargo, ND 58105-5002	701-231-8931	701-231-1013

7. PVPO NUMBER 200000232

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company? [X] YES [ ] NO
If no, give name of country

10. Is the applicant the original owner? [ ] YES [X] NO *If no, please answer one of the following:*

a. If original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. national(s)?

[X] YES [ ] NO If no, give name of country

b. If original rights to variety were owned by a company(ies), is(are) the original owner(s) a U.S. based company?

[X] YES [ ] NO If no, give name of country

11. Additional explanation on ownership *(if needed, use reverse for extra space)*:

See additional Exhibit E, Statement of the Basis of the Applicant's Ownership included in this application.

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.

2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.

3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.

STD-470-E (07-97) *(Destroy previous editions).*
Electronic version designed using WordPerfect InForms by USDA-AMS-IMB.

EXHIBIT E 200002321

STATEMENT OF THE BASIS OF THE APPLICANT'S OWNERSHIP

Drs. Robert H. Johansen (now deceased), Gary A. Secor and Richard Novy are/were employees of the North Dakota Agricultural Experiment Station and North Dakota State University, and are plant breeders who jointly developed Dakota Pearl, a white-skinned chipping potato variety for which Plant Breeders' Rights is being sought. The employees by agreement and because of the condition of the use of the facilities and funds of the North Dakota Agricultural Experiment Station and North Dakota State University, have assigned all ownership rights for the potato variety Dakota Pearl to the North Dakota Agricultural Experiment Station and North Dakota State University.

North Dakota State University on behalf of the North Dakota Agricultural Experiment Station has assigned all ownership of the potato cultivar Dakota Pearl to the NDSU Research Foundation. The NDSU Research Foundation is a nonprofit corporation set up to own and manage the intellectual property of North Dakota State University.

200000232

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U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MD 20705

EXHIBIT F
DECLARATION REGARDING DEPOSIT

NAME OF OWNER (S)	ADDRESS *(Street and No. or RD No., City, State, and Zip Code and Country)*	TEMPORARY OR EXPERIMENTAL DESIGNATION
NDSU Research Foundation	1735 NDSU Research Park Drive, Box 5002 Fargo, ND 58105-5002	ND2676-10
		VARIETY NAME 'Dakota Pearl'
NAME OF OWNER REPRESENTATIVE (S)	**ADDRESS** *(Street and No. or RD No., City, State, and Zip Code and Country)*	**FOR OFFICIAL USE ONLY**
Dale Zetocha, Executive Director	1735 NDSU Research Park Drive, Box 5002 Fargo, ND 58105-5002	**PVPO NUMBER**

I do hereby declare that during the life of the certificate a viable sample of propagating material of the subject variety will be deposited, and replenished as needed periodically, in a public repository in the United States in accordance with the regulations established by the Plant Variety Protection Office.

Dale Zetocha
Signature

9/25/06
Date

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200000232

North Dakota State
NDSSD
Seed Department

1313 18th St. N., P.O. Box 5257
Fargo, ND 58105-5257
Phone: (701) 231-5400
Fax: (701) 231-5401
Web: ndseed.com

Ken Bertsch
State Seed Commissioner

December 11, 2006

Dr. Paul M. Zankowski, Commissioner
Plant Protection Office
AMS, USDA
Room 500, NAL Building
10201 Baltimore Boulevard
Beltsville, MD 20705-2351

Dear Dr. Zankowski,

This letter is to verify and certify that tissue culture plantlets of the potato cultivar 'Dakota Pearl' entered for Plant Variety Protection have been deposited in the North Dakota State Seed Department repository and will continue to be maintained. The facility is a public, state sponsored agency, and cultivars maintained in the repository are available to the general public upon request after expiration of the PVP certificate.

The NDSSD Germplasm Repository is located in the potato propagation wing of Johansen Hall on the NDSU campus. *Solanum tuberosum* clones are propagated and maintained by well-established, industry-standard *in vitro* methods as they have been for over 20 years. In addition to normal month-to-month subculturing, a long-term, cool-temperature archival bank is maintained.

Sincerely,

Ken Bertsch
ND State Seed Commissioner

cc. Dale Zetocha